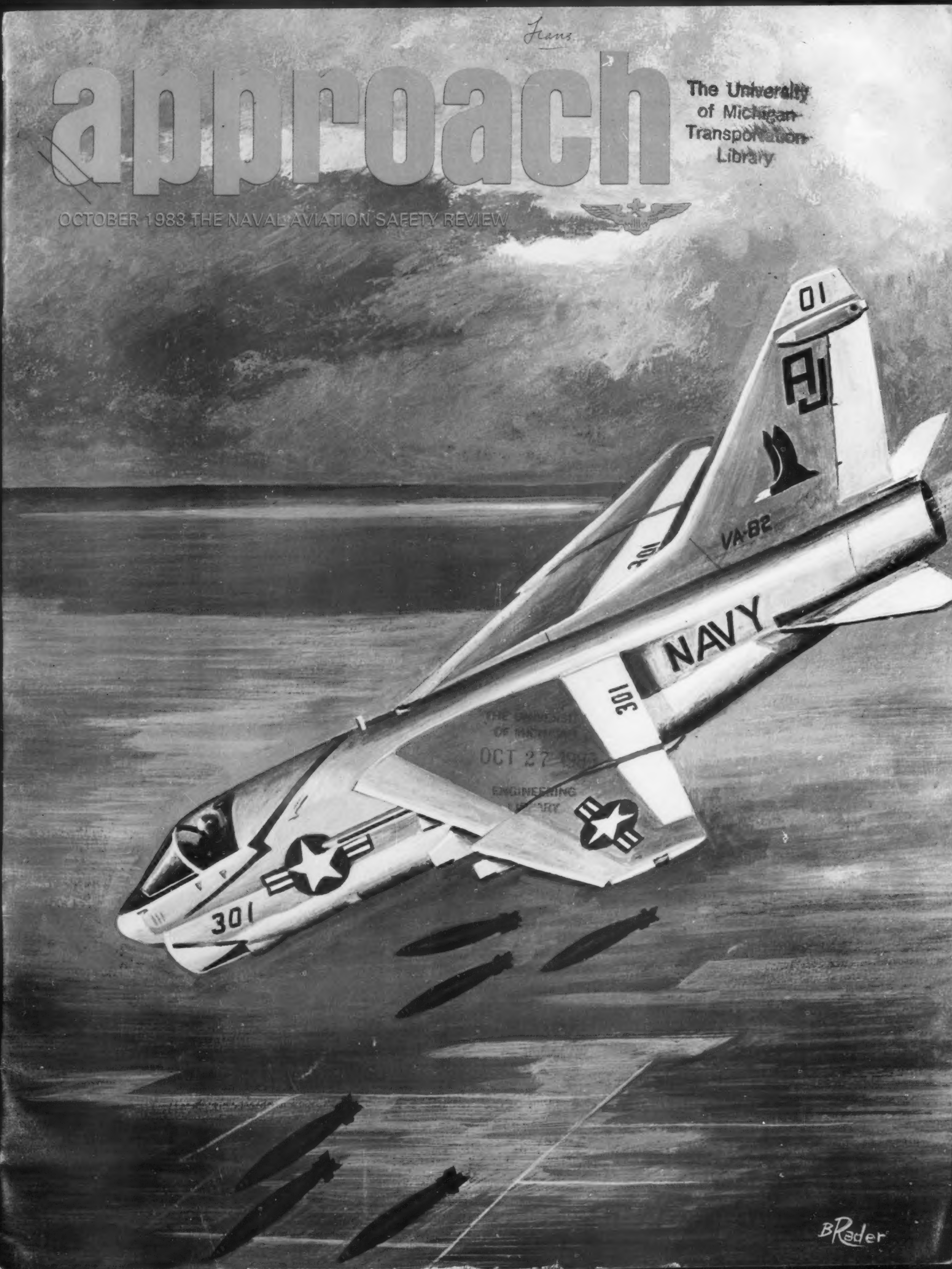
Trans

approach

OCTOBER 1983 THE NAVAL AVIATION SAFETY REVIEW



The Salt on Your Wings

By Lt. Cmdr. D. A. Duval
VC-1

ONE sunny afternoon years ago, one of our second-tour pilots came into the readyroom after completing a rare training flight ashore. He was on the verge of losing his temper, remarking on the poor basic airwork of a few of our nuggets. While that lack of expertise had also disturbed me, I wondered why I had never thought of being *angry* about it, like my fellow "salt." I think the difference between our reactions was at least partly due to the difference in our perceptions of where the shortcomings lay.

A few of us are "naturals" — the basics of flying are almost instinctive. And, while nobody is born knowing the mission, if the basics present little challenge, the mission often comes more easily. Most among us, however, have to work very hard to learn the basics and the mission and need regular practice to maintain adequate proficiency.

As nuggets, we *all* benefited under the watchful and critical eyes of our HACs, flight leaders, mission commanders and crew chiefs. For the "naturals," little may have been said over those early months or years, but the observation was constant and a vast wealth was built up of: technique, finesse, recognition of cues and checkpoints and of knowing how long to work on a deteriorating approach before giving up the efforts at salvage and going around. It was built up by practice, watching how the Big Fella did it and trying it out when the Big Fella was big enough to keep his hands to himself and his mouth shut (but his eyes wide open) until the appropriate moment. Every debrief contained at least one little gem and some, a whole diamond mine.

As the wings on your chest get salty, you'll prove yourself on many a long day and black night. *You* will be the Big Fella and you will have an obligation — to build crewmen that measure up to *your* high standards. Your flying dues include passing on the expertise you've gained in performing your mission. That much is obvious. But you also owe that nugget copilot (swimmer, RIO, wingman or second mech) the help he may need to *excel* in the basics.

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inside approach

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FEATURES

DEPARTMENTS AND STORIES

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Interview with Capt. Thomas K. Mattingly II USN, NASA Astronaut

NASA photo

By Lt. John Flynn
Approach Editor

Capt. Mattingly became a naval aviator in 1960 after carrier qualifications in the T-28. He then did a three-year tour in A-1s with VA-35 aboard the USS Saratoga, *followed almost immediately by a two-year tour in A-3Bs with VAH-11 aboard the USS* Franklin D. Roosevelt. *In 1966, he was selected as a NASA astronaut. He was the command module pilot of Apollo 16 in April 1972 and spacecraft commander on STS 4, the final orbital flight of the shuttle* Columbia. *He is scheduled to be the spacecraft commander again on STS 10, which is expected to launch in the late 1983 — early 1984 time frame.*

Being a naval astronaut, like being any other type of naval officer, is not without collateral duties. Capt. Mattingly has served as the astronaut representative in the development and testing of the Apollo spacesuit and backpack (EMU) system, head of astronaut support to the space shuttle system, technical assistant to the Manager of the Orbital Flight Test Program and head of the astronaut office ascent/entry group. He has also been the backup pilot/commander for four other space launches.

With his concurrence, I obtained a copy of Capt. Mattingly's Individual Flight Activity Report (IFAR) for "All Years." The entries are unusual for a naval aviator, to say the least. In addition to a wide assortment of familiar Navy aircraft, he has logged time in the B-26, B-57, F-100, F-104, F-106 and H-47. Some entries cause the reader to do a doubletake, such as: "APL16 — 266 hrs first pilot —one landing," and "ORBIT — 169 hrs — 65 night hrs — one landing. (The thought occurred to me that logging night time in orbit was an odd distinction.) All in all, Capt. Mattingly has logged over 7,000 hours of flight time.

APPROACH: Could you give a comparison of the flight safety programs that the Navy has and the programs that you have now in NASA? Have they learned anything from us, and can we learn anything from them?

CAPT MATTINGLY: We are just trying to learn how to reproduce some parts of a standard operation system. We have used the desire to have documentation like NATOPS as one of our objectives, but we are not there yet. Our process to date has been a little different than what you find in flying squadron airplanes, in that we don't have a large pool of experience to draw from that says, "We are going to write down on these pages, what it is you need to know." We have to use the other approach that says, "We are going to try to make sure that all of our flight crews know as much as possible about the way the vehicle is constructed and

NASA photo

designed, how it operates and the flight regime." We are going to synthesize lessons over a period of years, so we can try to transfer all that information. This is extremely time-consuming. If you can master all that information, obviously that is the best preparation any pilot can be given. But as we fly more often, there becomes less time available to convey all that information to our flight crews. Some of the new flight crew members didn't have a chance to grow up with the shuttle throughout its design and development, so there are a lot of lessons we are finding very difficult to capture and pass on.

Our objective is to come up with something like the NATOPS approach, where we can combine technical data with some ideas of how the shuttle is best employed. We are still working through that process, trying to figure out how to do it as we go, but we are a long way from being there. On the other hand, those of us who have been in the early parts of the program had the benefit of a far more in-depth training program than fliers in any squadron could ever enjoy. I think that is the secret to being successful; you can never know too much about the vehicle you are operating.

APPROACH: It is common knowledge that the space program has produced a lot of technical advances in the aviation field. What can naval aviation, in particular, expect to gain from the space program in the next 10 years?

CAPT MATTINGLY: I think the kind of things that we have done with the shuttle, for instance, have pioneered a great deal of flight control and navigation designs. But how much of that is appropriate? We build for particular problems, those being the problems of flying an airplane partly as a rocket, partly as a glider and partly as a spaceship, so we have a lot of solutions which are unique to handling that one specific suite of chores. But the design process of how we build that and the kinds of tools we use one day will probably find its way into military aviation. But I think the applications of it are going to be quite different, because our jobs are different.

APPROACH: Tom Wolfe, in *The Right Stuff,* gets into the controversy over how much the pilot of a spacecraft is indeed a pilot and how much he is basically just a passenger who is watching it all happen. How much control do you really have over the shuttle? In other words, if you are not at your best on a certain day could you accidentally allow the shuttle to fail in its mission?

CAPT MATTINGLY: That story was flavored in the Mercury days. We have come a long way since then, and as a matter of fact, the Russian program and the U.S. program have diversed significantly on that one fundamental point. We put the pilot in charge, and we give him all the tools he needs to do the job. That is the principle we design our operating procedures from, and our spacecraft are designed to support that. The Russians, on the other hand, have given their crew members the role of being essentially passengers into orbit and out of orbit. They give them tasks to do while in orbit, but not so much in terms of operating the spacecraft. Our approach has been entirely different; we put the flight crew in charge of running the vehicle. The issue of automation really shouldn't be confused with that.

People are very good at doing some kinds of things, like exercising judgment, making decisions, looking ahead, anticipating and having alternate plans. No computer can do all those things for you. That is the role you should reserve for the pilot. Now in terms of doing a precise job, if you can specify that job very carefully and make sure the conditions are well controlled, an automatic system will almost always produce more repeatable results in higher precision. So the pilot's job is to take a suite of automatic tools and properly employ them. Probably the most demanding part of that is when you come to land.

When you get close to the runway, the amount of flexibility you have and the number of options available are reduced in proportion to your distance from the ground. It requires some anticipation and requires that you plan ahead and do things that machines just don't do for themselves. That is why, to date, all the shuttle landings have been manual rather than automatic. We have built into the design of the shuttle an automatic landing capability. This was put in right from the beginning, in order to help us with the principle that you ought to be able to return from orbit whenever you need to, regardless of the weather. That is, you ought to have an essentially "zero-zero" capability. Our vehicles are precious; we only have a few of them. So our strategy is that we avoid those kinds of conditions, rather than try to learn to fly through them. We believe in letting the guy fly the airplane, particularly the landing. We have a lot more confidence in the pilot's ability than we do in the automatic system.

APPROACH: On a personal basis, how do you compare the stress of a shuttle landing with say, a night trap?

CAPT MATTINGLY: (Laughing) I think it is rather comparable, and to put it in perspective, remember that you can't bolter!

We stack the cards in our favor, of course. We ensure that we have everything possible going for us, and we take great

pains to do that, because it is such an expensive machine. It is a good flying machine, but it is very intolerant of error. That is no different than taking a plane aboard ship at night.

We are getting ready to do our first night landing on this next mission. We have adopted a number of things in order to help us with our final approach glide slope control. Those of us who came from Navy backgrounds said that we really would like to have a mirror on final. However, we couldn't get one that had a large enough angular range, so we built something we call a "ball bar." To the pilot, it looks just like a set of red datum lights and a yellow light that's physically closer to the approach end of the runway. On the final approach glide slope you fly that yellow light against the datums exactly as you would on a mirror system. That has done wonders for improving our confidence and ability to do this stuff at night.

APPROACH: Have you ever been involved in a safety-related incident that would be of interest to Approach readers?

CAPT MATTINGLY: Well, not too long ago I ran off the runway. I got caught one night in a thunderstorm on a wet runway and started to hydroplane. I went off the side of the runway at about 1,500 feet. This introduced me to a subject called "reverted rubber."

If anyone understands that subject, I haven't met them yet. But it seems there is a speed below which, depending on the tire pressures, you should not get dynamic hydroplaning. That is unless you get this reverted rubber, which they describe as a "steam clean" on the bottom of the tires. A little bubble builds, and the tire floats on it. This can cause hydroplaning down to almost zero velocity and that was the explanation for what happened to me. I said to the engineers, "Gee, do you know how to prevent it or what a pilot can do to make it better or worse?" That seems to be a subject that somebody needs to think about, because apparently there are no good answers. The engineers can tell us the physics of what happens, but other than recognizing that you are out of control, nobody seems to know what the proper procedures are.

In the process of doing the accident investigation, we ran a whole bunch of calculations on side forces and what happens to an airplane in a crosswind, on a runway when you don't have any traction. It is the kind of thing that most airplane drivers don't think about, because in all of our experiences, even if you get a little bit of hydroplaning or sliding, and you slow down, generally all that gets well in a hurry. You just have another sea story.

NASA photo

APPROACH: Do you foresee a time when Navy fliers will go into space as part of their normal careers?

CAPT MATTINGLY: Yes, I do. As a matter of fact, we are working on a setup where a junior guy can come down here on rotational tour, get some time in the (space shuttle) cockpit and then return to the fleet. I think that may only be a few years away.

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AIR BREAKS

Blue-water Barricade Landing. The last event tanker mission has always carried with it a certain level of anxiety for those in the A-6 community: "Who will be there for us if it's *our* turn in the bolter/waveoff pattern?" The normal level of anxiety was increased for Lt. Cmdr. Larry Munns, pilot, and Lt. Cmdr. Carl Roed, B/N, of the Attack Squadron 52 Knightriders on this KA-6D night mission during blue-water flight operations.

The arresting hook malfunctioned and fell to the deck when the catapult fired. The hook point struck the catapult shuttle faceplate as the aircraft became airborne. The aircrew perceived a normal launch except for illumination of the tailhook transition light. The malfunction was reported by observers on deck and the decision-making process began; blue-water ops, no divert, shuttle faceplate damaged enough to suspect arresting hook and possible aircraft structural damage. Airborne visual checks confirmed neither. Consulting CV and LSO NATOPS left no doubt as to the proper course of action — recover 513 in the barricade! Opting for the worst case, all aircraft were recovered aboard before 513.

The flight crew prepared for their straight-in approach and dumped fuel to engaging weight. The airwing LSO targeted the one wire and briefed the flight crew. The ship was steadied with 25 knots of wind down the angle. Once the barricade was installed, the air boss cleared the flight deck of all unnecessary personnel.

The aircrew flew an OK underlined (perfect) approach, landing with minimum hook-to-ramp clearance, 50 feet short of the one wire and on centerline. There were no injuries and 513 suffered minimal damage. This was the first barricade landing for the *USS Carl Vinson*/Airwing 15 team. Kudos to a professional effort all around.

Five Ounces of Oil. On 9 June 1983, Lt. Andy Ingram, VT-7 Instructor, and Lt. Cmdr. Carl Davies, Instructor Under Training (IUT), were airborne on a TA-4 syllabus IUT flight to NAS Cecil Field. Approximately 20 miles west of the field, passing 15,000 feet on an en route descent, Lt. Cmdr. Davies noticed the 20 percent oil light illuminated. Lt. Ingram immediately declared an emergency and set power at 87 percent in accordance with NATOPS. Weather at Cecil was reported as 600 feet broken, variable overcast, visibility four miles in haze.

Precision approach radar was inoperative, and the aircraft's TACAN had failed during the flight. Lt. Ingram extended the speedbrakes to slow the TA-4 for an actual low-oil surveillance approach. Passing 6,000 feet on a close-in box pattern, Lt. Ingram observed the oil pressure beginning to fluctuate between 30 and 50 psi. Cecil weather was now 400 feet obscured, visibility two miles in haze. Lt. Ingram continued the descent and flew his aircraft to an uneventful landing after acquiring the field visually at 500 feet AGL. The engine was shut down immediately after the TA-4 cleared the runway and the gear was pinned. The postmaintenance inspection revealed that, due to a badly leaking accessory gearbox tower shaft, *only five ounces of oil remained.*

This aircrew's timely response to the emergency enabled them to land the aircraft safely within five minutes after the initial low-oil indications.

What Went Wrong?

By R. A. (Chick) Eldridge
Approach Writer

WHENEVER a fatal aircraft mishap occurs, one of the first questions in the minds of those concerned is, "what went wrong?" This is particularly relevant when the pilot is an experienced aviator with lots of time in type. This is not to say that the same question isn't also appropriate in a fatal mishap involving an inexperienced pilot, but statistics bear out the fact that experienced pilots are less prone to make fatal errors in judgment.

An experienced pilot with 1,300-plus hours in A-4 aircraft was participating in a close air support mission as the section leader. When his original wingman's aircraft developed mechanical difficulties, another pilot who was manning up at the same time was designated as a substitute wingman. Briefing for the replacement wingman was conducted over the radio on squadron common. The new wingman had been briefed previously for an identical sortie scheduled for another area of the range. He had no questions concerning the mission.

When the two-plane flight arrived in the target area, they were given the forward air controller (FAC) brief. It was a standard high-threat close air support (CAS) brief on UHF with a five-minute time to target. While proceeding inbound to the target in a combat spread, the flight descended to 300 feet. The lead was offset from the target about 30 degrees left to allow for a pop-up right roll-in. As the lead popped and rolled in for his run, the FAC commenced a verbal target description. Despite this, the leader was unable to acquire the target and aborted the run. His wingman did the same. After getting into position for a reattack, there was additional discussion between the FAC and the leader concerning target location. As lead approached the target, he popped up to about 4,500 feet for his run-in. He commenced an estimated 15-degree dive while still discussing the target with the FAC. (The maneuver specified only a 10-degree dive.) In the final portion of the run, the leader stated: "I think I've got them." The FAC transmitted: "Any vehicles you see, cleared hot." Lead then replied, "Roger, I'm in."


A starboard slat piece was found in a tree 250 feet away from the initial impact point.

What happened next can best be described by the wingman: "Lead seemed very high in the pop with a long run-in. As the lead was halfway through his run-in, I began my pop. Just as I was about to begin a transition to a pulldown, I looked across to observe the lead's position. At this moment I realized he was at about normal release altitude, somewhat steep, approximately 15 degrees. He then continued his run and appeared to get very low. At this moment I thought, 'pull up!' He immediately began a quick pullup. He appeared to be very low to the ground. I saw him start a slight, 10-degree noseup climb from what looked like out of a grove of trees. I then saw something that looked like a piece of the aircraft, white in color, leave the aircraft. Immediately the aircraft began billowing fuel and simultaneously rolled to the right almost inverted, and then came back down to about a five-degree nosedown attitude. The aircraft impacted the ground in this nearly inverted attitude. I observed a huge ball of fire followed by a line of fire about one-half mile long."

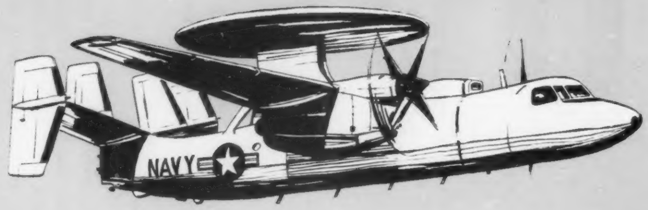
In attempting to analyze what went wrong, the conversation between the FAC and the pilot was considered. Such a conversation would distract from cockpit situational awareness in the dive — at a time of high cockpit workload, i.e. altitude, dive angle, switch positioning, etc.

Another factor was that the pilot had popped up to a higher than usual altitude — presumably to attain a better look at the target he was attempting to acquire. This excess altitude led to a steeper dive than called for.

Another possibility was that the pilot may have made a switchology check in his dive and discovered that his switches weren't set correctly. (When the ordnance panel was discovered in the wreckage, it was not properly configured for ordnance delivery.) This could have distracted his attention sufficiently that when he again glanced outside he realized he was *in extremis* and applied excessive G in attempting to pull out. On the pullout the A-4 struck a tree 16 feet above the ground, which dislodged pieces of the starboard wing and starboard slat from the aircraft causing it to flip inverted and out of control.

In this mishap, training and proficiency were insufficient to surmount an error made during the critical phase of a high-threat ordnance delivery. It is imperative that continued emphasis must be placed on the hazards associated with diversions of a pilot's attention while maneuvering at low altitude.

A Piece of Cake



By Cmdr. C. B. Place
VAW-113

IT was early morning, east of Okinawa, and the bogeys were in the air. The exercise was called away at 0510. Two *Hummers* were manned and turned, but only the first one up and ready would go. At 0510 I wanted documentation in my flight log of my heroic contributions to the nation's defense. Fortunately our alignment came up first. The Skipper looked none too happy as I taxied past him to the cat, but that's the breaks of naval air. I would have the whole flight to rehearse my sincere commiseration on slow alignments.

The first hour was routine. The system came up with very little coercion as we headed for station somewhat below light speed. Around 0600, two unknown air contacts appeared on the scopes. The fighters launched to intercept and escort the interlopers. It was pure textbook in all respects.

The ship, trying to reestablish the rest of the day's schedule, told us to plan and coordinate a divert into Kadena and return to cover the first regular event. Radio contact with the divert was sporadic but Approach Control came up loud and clear, was briefed on our plan and was ready to assist.

Around 0630 the pilot noted that the port reduction gear oil pressure was spiking, and the *quantity* indicator had flopped over to "LOW." Either indicator alone would have been noted with some interest. Together, the symptoms received more than a casual comment. Nothing was visible on the nacelle, but the view from the cockpit of an E-2 has never provided for close inspection of anything. We turned inbound to the ship (slightly offset from a straight line to Kadena but also 100 miles closer) and advised them of our problem.

While the options to divert or recover aboard were being reviewed, the front end was monitoring power section pressure and oil temperature, discussing the possibility of a shutdown and reviewing single-engine landing, bolter and Bingo procedures. The back end was updating vectors to the ship, advising the mission agencies of our status and preparing themselves for a bailout or ditch.

During the flight inbound the decision was made to take us aboard. A pull forward was underway, and we would have a ready deck about five minutes after our ETA overhead. Marshal and Approach were ready for us with a modified overhead holding into the bolter/waveoff pattern. The timing was perfect for getting us to the ramp with a ready deck.

By the time we turned onto final at about four miles, the reduction gear oil pressure was spiking constantly but averaging around 150 psi. More ominously, the power section pressure was starting to twitch. The oil temperature was still rock solid in limits.

Paddles came up and confirmed our status, both engines still on line, the port side probably OK for the duration but with a shutdown a distinct possibility. Ball pickup at three quarters of a mile was right on glide slope. Somewhere inside ball pickup, the power section oil pressure began spiking also. A quick mental review of single-engine bolter procedures and then the pilot stuck the hook right in the wires. Once clear of the landing area (the fighters were right behind us), the engine was secured.

Doesn't make for much of a sea story. ("Did I ever tell you about the time I almost had a single-engine?") The point of this whole story is how smoothly and professionally the problem was handled by so many individual but interrelated agencies. The pilots diagnosed the discrepancy and prepared for the worst eventuality while maintaining all their options. The NFOs wrapped up the mission and took over the necessary (but oft-times distracting) advisory and administrative radio transmissions. The ship integrated all the information available and competing requirements, made the decision to recover the aircraft, then conducted an expeditious pull forward. Approach put us right on the money, and the LSO was ready to accept a plane with a definite discrepancy and possible emergency. The actual recovery was a piece of cake.

The problem? A blown engine seal resulting in a steady oil leak. Thanks to everyone involved, you can't look at my log book and single out this flight from any of the others.

More Than You Ever Wanted to Know About Your Pressure Altimeter

By Lt. Cmdr. P. R. Drake
Oceanography Department
U. S. Naval Academy

Even with the latest altimeter setting dialed in, what you see is not always what you've got.

A PRESSURE (aneroid) altimeter indicates height by measuring pressure and through an analog mechanism solving the hydrostatic equation ($P = \varrho gz$) for altitude (z). (See figure 1.) All naval aviators know the importance of operating with a current altimeter setting, and the rule of thumb "from high to low, look out below" probably still rings in their ears from their last instrument training. A change of only a tenth of an inch in the barometric pressure can put you 100 feet closer to that obstacle than you thought and with possible diurnal and spatial (a tank's range for even the short legged birds) variations on the order of .5 inches it is an eye-opener which keeps all pilots cranking in that latest Kollsman setting. So with the latest and nearest setting dialed in, you are proverbially "fat, dumb and happy, believing what you see is what you got." But is it?

That analog mechanism we mentioned earlier is programmed for a standard lapse rate (decrease of temperature with increase of altitude) of 1.98 degrees centigrade per thousand feet. The meteorological term "standard" is very similar to the naval term "standard," that being a basis from which the real world deviates. Hence, if there is a true standard lapse rate physically present, blink and it will be back to a more "abnormal" lapse rate. Those of you with some background in the physical sciences may interject: "But a nonstandard lapse rate will be reflected in the barometric pressure for that location since the atmospheric pressure is just the weight of the overlying column of air. Therefore, a lesser lapse rate will yield warmer less dense air and a lower Kollsman setting which cranks in a safety factor for we dauntless aviators and our obstacle clearance."

This point of view has a couple of problems. First, atmospheric pressure is not truly the weight of the overlying column of air. This would be true were there no air motion.

gradient force. This all takes time, and until the motion stops we have high pressure associated with a lesser lapse rate.

A second problem with the idea that nonstandard lapse rates are corrected for by the Kollsman setting is that even in the presence of no vertical motion a greater lapse rate may be overlain by a lesser lapse rate, thus yielding an air column with the "normal" amount or mass of air, but having a distribution which upsets the programming of the analog mechanism in our altimeter. That is, we may have a normal 29.92 inches at the surface, but we can have some severe altitude errors from our preprogrammed standard lapse rate analog mechanism. This meteorological phenomena of nonstandard lapse rates is especially evident in the presence of strong inversions or very stable atmospheres.

For dry air: $P = \varrho RT$ and $P = \varrho gz$

$$\varrho RT = \varrho gz = z = (R/g)\,T$$

From figure 1, lapse rate deviations may be shown to introduce major errors in indicated altitude. Figure 1 has an actual lapse rate deviation from the standard lapse rate which has been exaggerated for clarity, but from the figure it should be apparent that any deviation will introduce error, and the larger the deviation, the larger the error.

To further complicate the issue, we have been discussing dry air. What happens when moisture or humidity is introduced? Moisture or higher humidity actually decreases the density of the air (higher DA with higher humidity). Thus with all else equal, if you go from a wet air mass to a dry air mass and maintain a constant indicated altitude, you will actually be descending. The highest saturation levels of water moisture is only about three percent partial pressure of the total atmospheric pressure, hence lapse rate devia-

you've got.

This point of view has a couple of problems. First, atmospheric pressure is not truly the weight of the overlying column of air. This would be true were there no air motion. That is, if the atmosphere had reached a complete state of stability or static rest. Unfortunately, crosswind landings and turbulence of the thunderbumpers are proof-positive that this is never the real world case. Thermal highs (high atmospheric pressure) are actually warm areas (lesser lapse rates) in which the pressure (P) is equal to the density (ϱ) times the absolute temperature (T) times the gas constant (R) (Gas law: $P = \varrho RT$). As T goes up, P goes down and there is expansion or vertical motion from the resultant pressure

actually be descending. The highest saturation levels of water moisture is only about three percent partial pressure of the total atmospheric pressure, hence lapse rate deviations are more likely to introduce altitude errors since their effects are greater.

As a pilot, you have no knob to adjust the altimeter for a nonstandard lapse rate, or for an especially dry or humid day, so what can you do about all the information just presented? Well, the refrain we started out with "From High to Low; Look out Below" can be remembered now as "From High to Low, Warm to Cold, Wet to Dry, Look out Below" and keep that Kollsman current!

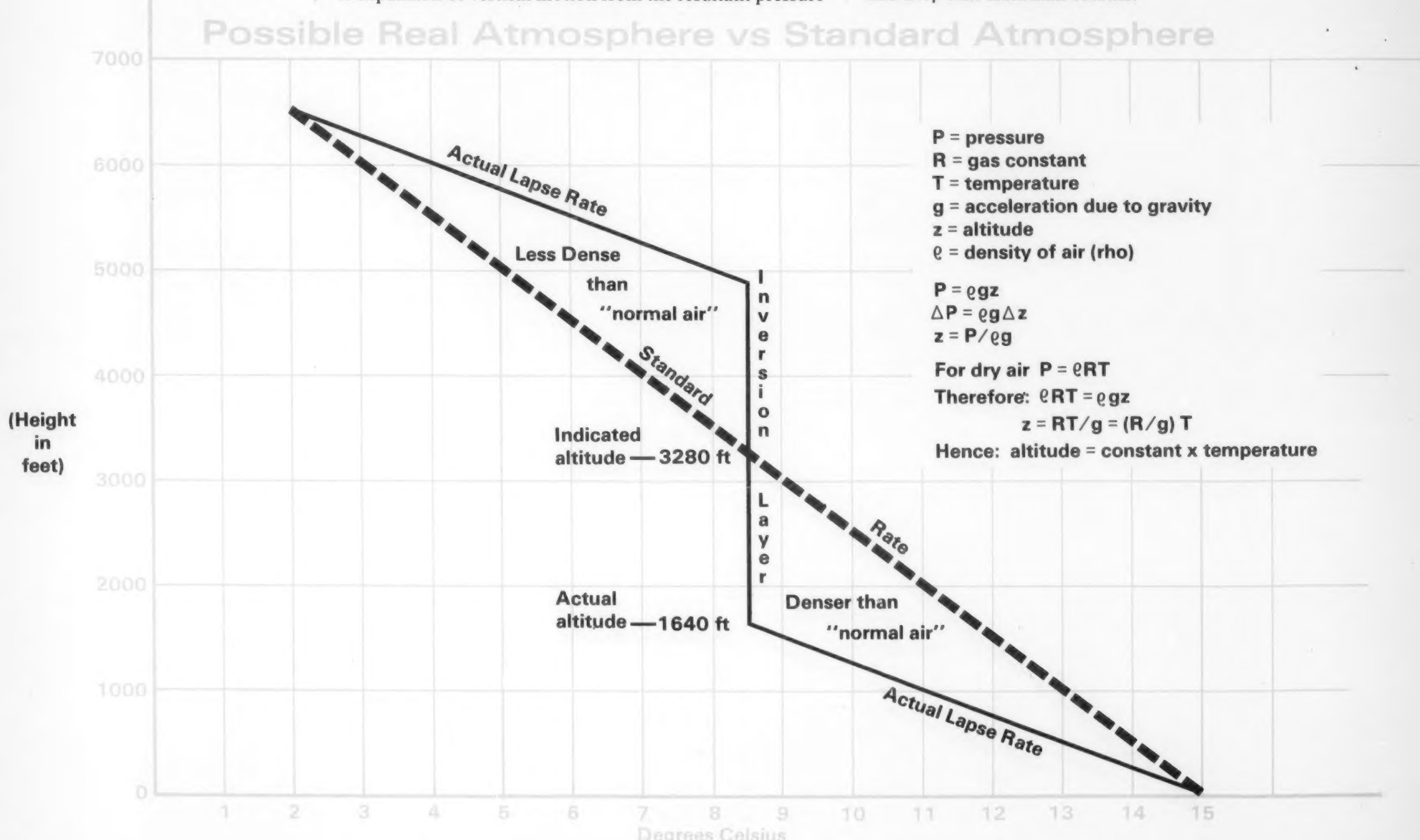


Figure 1

APPROACH diagram by Frank L. Smith

Ready to take off?

Ready to *not* take off?

By Lt. Mike Foreman
VP-23

"FLIGHT, Aft, we have torching on the number two engine!"

"Roger, *abort!*" The P-3C was at its maximum recommended takeoff weight of 135,000 pounds. The night was pitch-black with rain showers in the vicinity. The 9,600-foot runway was wet but even considering the high ambient temperature, no refusal speed was necessary. Section 11 of the P-3C NATOPS manual had confirmed to the flight crew that the aircraft could be accelerated to the rotation speed of 131 knots and then stopped, if the need arose, with runway to spare. Indeed, the need did arise. During the takeoff roll two malfunctions on the port inboard engine occurred; a bearing between the combustion and turbine sections and a fuel nozzle both failed. The resultant flames which leaped more than four feet from the engine's tailpipe cued the port aft observer to the problem. By the time the flight station was notified, the aircraft was accelerating through 125 KIAS. An abort was initiated at 129 knots, just two knots below rotation speed.

Zooming down the runway at 129 KIAS and 135,000 pounds are you thinking "Abort?" Or are you mundanely waiting for your copilot to call "Rotate" at 131 KIAS? Boy, you sure seem to be eating up a lot of runway today. Taking off with full tanks makes a big difference. You are probably wishing that you hadn't accepted that intersection departure, even with 8,500 feet remaining. Maybe you should have checked your flight engineer's refusal speed computations. On a dark night 4,000 feet of runway remaining doesn't look like much when you're sitting in front of 68 tons of fuel and machinery doing almost 130 knots. How will you react if your engineer calls out, "Chip light — number four!"? On most days and most runways you *will* be able to stop your "bagged-out" P-3 at any speed up to the rotation speed. When things are tighter and you do have a refusal speed, a high-speed abort will be even more critical. These aren't the same aborts you practiced in the RAG. Practice aborts aren't normally done at 135,000 pounds or at any weight even close to that. The first time you do a heavyweight, high-speed abort it will probably be under actual conditions. Ask yourself: Am I ready? Is my crew? It will need to be a coordinated effort. If the abort has to be done with only three engines, asymmetric reverse will complicate matters. If it's also dark, wet and/or icy, then you'll really have your hands full.

In this case, smooth coordination in the flight station resulted in the plane being stopped with no further problems. Had the crew become airborne, catastrophic engine failure would have undoubtedly occurred within seconds, necessitating a three-engine maximum weight climb and an emergency landing. How many of you are ready for *anything* to happen on *every* takeoff roll? Several things can be done to increase the safety margin. Using the entire runway vice accepting an intersection departure is obviously good headwork and setting power prior to releasing the brakes will save you a couple of hundred feet. Most important, when you're ready to take off you must be ready to *not* take off (i.e. abort).

What about *after* refusal/rotate speed? Bang! An engine quits! What's your three-engine climb speed? You must at least climb to pattern altitude, right? Instead of reacting instantly, are you wondering why the number four engine just caged itself? Does your engineer brief V503? The list goes on and on . . . .

The P-3 community enjoys a low mishap rate. The disadvantage of this is that every uneventful P-3 flight promotes complacency. "Expect the unexpected" is a cliche used quite often but these are words to live by.

BRAVO ZULU

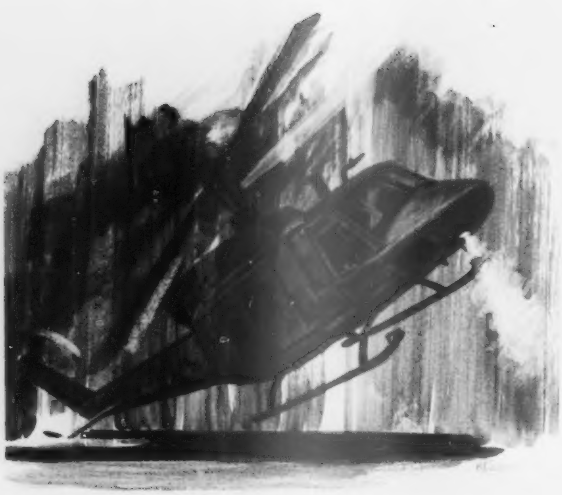
Cmdr. Randy Abshier, HS-11
Lt. j.g. Fred King, SH-3H

WHILE flying plane guard on alert for an A-7 recovering aboard with zero oil pressure, the SH-3H experienced a No. 2 engine failure. The HAC, Cmdr. Abshier, was unable to maintain single-engine flight. He broadcast a mayday and executed a water landing. He ordered the copilot, Lt. j.g. King, to activate the flotation bags to increase helicopter stability. Anticipating a water takeoff, he lightened the helicopter by having the crew jettison equipment and dump fuel. Following an unsuccessful attempt to start the failed engine, Cmdr. Abshier determined that a single-engine water takeoff would be the best course of action. As Cmdr. Abshier stabilized the helicopter against 5-foot swells, Lt. j.g. King performed the water takeoff checklist. A jump takeoff was attempted, but with rotor speed decaying through 82 percent and the helo settling, Cmdr. Abshier relanded the aircraft in the water. A second water takeoff attempt was also unsuccessful. Because of an anticipated failure of No. 1 engine due to water ingestion from swells, and because of increased gross weight from water entering the cockpit through the rudder pedal openings, Cmdr. Abshier decided to make one more attempt at a water takeoff. He had Lt. j.g. King recheck the checklist, verified that petty officers Maulsby and Dicenso had stripped the ship of loose gear and were securely seated and then attempted his third takeoff.

The helicopter lifted, just clearing the tops of the swells. Upon drooping rotor speed to 90 percent, the helo impacted several swells and settled back into the water. Cmdr. Abshier lowered collective, increasing rotor speed to 94 percent. Telling Lt. j.g. King to ensure full manual throttle, Cmdr. Abshier increased collective, drooping rotor speed to 88 percent. By maintaining 88 percent rotor speed and planing on top of the swells, he was able to gain sufficient speed to get the helicopter airborne. He then landed safely aboard the carrier.

Knowledge, professionalism and excellent crew coordination overcame a deteriorating situation and preserved a valuable asset.

Left to right: AW1 Jerry Maulsby AW2 Tony Dicenso, Cmdr. Randy Abshier and Lt. j.g. Fred King.



Risking a Crew and an Aircraft

By Russ Forbush
Approach Writer

AIRCRAFT operating and maintenance restrictions are imposed to protect against personnel and material losses. Since many were written in blood as the result of previous mishaps, why in the name of common sense don't we have total compliance with these restrictions? Why are there a few among us who, for various reasons, will attempt to get the job done at all costs when they should know from past history that these costs can and do include the loss of lives and/or aircraft? The mishap described below is a case in point. The aircraft involved is a UH-1N, but this action could have centered around any model plane, therefore, there's a message here for all of you who control, fly, maintain and support naval aircraft.

The mission passed to the squadron requested a late night movement of five personnel from an island to a lit LZ, a distance of about 19 nm. The assigned HAC never looked at the mission request but *assumed* the flight was one regularly flown by squadron pilots: a personnel shuttle from the island to an Air Base (AB) some 22 miles away. In his brief to the HAC, the ODO merely mentioned that five passengers were to be picked up on the island and the HAC did not ask for further details.

The aircraft discrepancy log of maintenance action forms (MAFs) showed that the assigned Huey had discrepancies with the low fuel light in relation to the fuel quantity indicated. The latest low fuel light gripe was still awaiting maintenance action. OPNAVINST 5442.2 (MESM) states that for the UH-1N, a main fuel system discrepancy renders the aircraft not safely flyable. Maintenance Control did not consider illumination of the fuel light with 350-450 pounds of fuel indicated on the fuel gauge a downing gripe, so the aircraft was certified safe for flight.

All preflight functions were completed without incident. The HAC lifted the Huey from Homebase at 2230 and departed for the island. Upon arrival, the HAC found that there were nine passengers and 500 pounds of bulky cargo to be airlifted vice the five passengers listed on the mission request. Since he *assumed* his destination was the AB, and two trips would be necessary to transport the passengers and cargo, the HAC put in a request for a fuel truck to stand by at Homebase to refuel his aircraft.

Following takeoff from the island, the passengers set the pilot straight on their true destination — the lit LZ. This prompted the HAC to cancel his request for a fuel truck because the flight to the LZ was much closer than the AB and he had direct routing due to clear weather. He felt there was sufficient fuel onboard to safely complete the mission.

The HAC landed the H-1 at the lit LZ and offloaded all but one passenger and the cargo. During the stops at both the island and the LZ, the HAC secured one engine and reduced the other to flight idle for a period of about five to 10 minutes for fuel conservation purposes.

The HAC lifted off from the lit LZ at 0023 with between 400-450 pounds of fuel registering on the fuel gauge. His final destination was Homebase, some 22 miles away. About two minutes after takeoff, the low fuel light illuminated. The UH-1N NATOPS states that upon illumination of the low fuel light, the aircraft contains 150 pounds plus or minus 20 pounds of fuel remaining (13 to 17 minutes). The HAC decided to continue on to Homebase vice returning to the LZ, assuming he'd be there in less than 10 minutes and have sufficient reserve fuel onboard the Huey.

About six or seven minutes after the low fuel light came on, the No. 2 fuel boost pump light illuminated. The HAC directed the copilot to follow NATOPS for a No. 2 fuel boost pump failure. The copilot then pulled and reset the circuit breaker, but the light failed to extinguish so he again pulled the circuit breaker. The No. 1 fuel boost pump illuminated about 45 to 60 seconds later and the HAC initiated a turn toward the AB which was the nearest suitable landing site available. Ten to 15 seconds later both engines flamed out. The pilot initiated an autorotation and contacted AB Tower to declare an emergency and tell them he was making a forced landing. The autorotation was started at an altitude of 500 feet and 110 KIAS.

The landing light was on when the HAC made a shallow

A view from the inside of the cockpit following the mishap.

left turn to try and acquire a landing site. He noticed a residential area dead ahead and turned back to the right where he selected an unlit area below for the point of landing. No altitude readouts were provided to the pilot by the copilot during the descent. The HAC initiated a flare at an undetermined altitude. No crewmember was to later recall illumination of the low light or the radar altimeter which was set to come on at 100 feet. The aircraft was in a nose-high attitude when the tail struck the ground. The fuselage came to rest 53 feet from the initial point of contact at time 0032. The landing site was an uneven field surrounded by electrical wires and hills located in a residential area. Members of the crew received assorted injuries, some requiring hospitalization. The aircraft sustained Alpha damage but was repairable.

A postmishap inspection of the H-1's fuel system revealed that there were 10.4 gallons of trapped fuel (7.9 useable) remaining in the right forward cell. A clogged in-line fuel strainer rendered the associated fuel ejector (jet) pump partially to totally inoperable and unable to transfer fuel from the forward part of the fuel cell to the aft section where the fuel boost pump/fuel pickup point is located. Nevertheless, had the trapped fuel been available for use, a successful termination of the flight at Homebase would have been mighty marginal.

A lack of proper maintenance supervision played an important role in this mishap. First of all, the H-1 should not have been placed in an "UP" status due to the low fuel light/fuel quantity gauge discrepancies. This was clearly spelled out in the MESM. Second, the avionics shop supervisor had little practical experience on the job. Third, the fuel quantity gauge was calibrated using an unauthorized procedure. This procedure had been in use for several years in this unit. It generally follows the MIMS specifications, except that the high side adjustment (full) for crashworthy systems indicated 1,271 pounds vice the MIMS value of 1,575 pounds. And finally, there was an apparent absence of an aggressive quality assurance (QA) program within the squadron maintenance department. Detection and elimination of improper maintenance procedures, and trend analysis to detect recurring discrepancies are a QA responsibility. Had this responsibility been properly fulfilled, this mishap could have been prevented.

In addition to the cavalier attitude toward fuel minimums and the low fuel warning light, a casual approach was also evident in all phases of preflight planning, mission planning and crew coordination. There was no squadron SOP covering these areas. The pilot didn't know what his destination was until after departing the island, and the ODO failed to give him an adequate brief. The pilot believed his fuel quantity gauge instead of the low fuel light and pressed on to Homeplate instead of turning back to the lit LZ which was only two minutes away. Once again the desire to complete a mission caused an aviator to extend himself and his aircraft beyond their limits.

This squadron's TYCOM has a longstanding and well known policy that no peacetime mission warrants risking a crew or an aircraft. When a squadron fails to abide by this policy, for whatever reason, it is opening the door to disaster.

The Repeat Customer

By PR2 R. S. Balaszi
VS-37

AFTER almost 10 years as a parachute rigger in the Navy, I've seen many pilots and aircrewmen, from seasoned commanders to young ensigns hoping for their first centurion patch. For the most part they were, and are, some of the best in the world. Knowing that you're good enough to land an aircraft on a postage stamp-sized platform out in the middle of nowhere would tend to make you extremely confident and give you a "can do anything" attitude. That attitude is really great. But what bothers me is another attitude that I'm seeing more and more often; the "it's not going to happen to me" attitude, not in all of the people, of course, but quite a few. I think even one person with this attitude is one too many. I suppose most of you who are reading this right now are saying, "not me." So I'll ask you this: When was the last time you took a good look at your flight gear? Yesterday? Last week? Last month? How many flights have you made since then? Here are only a few examples of what I found just last week:

- Aircrewmen walking out of the shop with LPU bladders hanging out.
- Mask brought in postflight with an ICS problem. The only discrepancy found was the cord was not plugged into the lower hose. (The individual stated that he didn't know where it went.)
- Helmet chinstrap off on one side, screw missing (noticed while manning aircraft).
- The thing that bothered me the most was offering a crewman a radio and being told: "No thanks, I'm not going to crash today." Optimism is nice, but . . . .

These are just four out of many, many similar incidents. We as parachute riggers cannot look over every piece of gear each day. We would like to, but it is just impossible. Therefore, it is **your** responsibility as pilots, NFOs and aircrewmen to become totally familiar with **your** gear. You owe this not only to yourselves but to your shipmates and your loved ones. Learning how to, and then religiously performing a preflight on **all** your flight gear will greatly reduce the chance of going up with nonfunctional gear. I know it may be inconvenient and that it takes a little time, but consider that the alternative could mean **your** life. Preflighting is relatively simple and takes less time than you think.

If you have any questions about your gear or any authorized modifications you wish to make, don't hesitate to ask. We will answer if we know or find out if we don't and then inform you. We hope you never have to use our gear, but if you do, we want you as a repeat customer.

A Pilot Sings the Blues

By Capt. Dave Winston
HMH-461

THE myriad of "must do's" is mind boggling to say the least. Here we are at 500 feet. "Go west young man," someone famous has said — to the land of the 60-mile visibility, the 60-knot dust storms, the 60-foot cactus which will reach right up when you're flying low and grab you where it hurts. Well, at least we'll be closer to the sunset!

Here's the next checkpoint — time to change airspeed, transfer fuel, turn to follow the orange line, ask the crew chief how dash three and four are doing and ponder preparations past . . .

Boy I sure am glad the planning for this was so painless. All I had to do was:

Get the Air Ops Manual for Garden Spot West.

Put together a course rules lecture so we can actually understand the one we will get when we arrive. You know the one — it's given at just under mach one: Do this; Don't do that; Can't you read that sign?

Get the premishap plan adjusted for another place and time. (New phone numbers, new chain of command, new living arrangements).

Fly.

Don't forget something to read — (How to Interpret the License Plates of the Fifty States of the Union — complete with full color photographs).

Arrange the desert survival, heat stress and cold weather survival lectures for the troops.

Get ready for the AOM.

Have the AOM postponed till the middle of the exercise (Natch).

Inventory the aircraft mishap investigation kit.

Take care of the 7,500-mile check on the car.

Fly.

Make sure the wife knows that BAS will be checked, even though the last critique said that wasn't cool because of missed meals. I know, let's reinvent the wheel!

Take care of a couple of Flash reports.

Check on mishaps in the Med.

Study for TERF and mountain flying.

Grind up the garden.

Winterize the lawn.

Chop some firewood.

APPLY FOR CHRISTMAS LEAVE (should be at the top of the list).

Change the oil in the lawn mower.

We're gonna miss the Ball again (my one chance to wear the blues instead of sing 'em).

Double check the expiration dates of NATOPS checks, instrument checks, flight physicals, etc.

Get the front end aligned.

Make sure to get the address out (love that mail).

Arrange the finances.

Is the power of attorney current?

How many birds will go into phase on the way out?

Get the safety survey arranged for when we get there.

What do we do if a bird goes down en route?

Can we wash them out there without going to Tustin or Yuma?

Can't take the green machine because of crummy ohms.

Fly.

Double check the plastic. I hope it doesn't expire while we're gone.

Check the maps and jetlogs for accuracy.

Pack three days before, so we can weigh in and cut down to 110 pounds. Include the beach chair and the latest Penthouse.

Check for relatives' birthdays while I'm gone.

Prices for the C-Rats for missed meals.

Who's going to endorse the orders so we can liquidate the TAD claims?

Update the 12-hour Bottle to Brief brief for the way out.

Oh yeah — Don't forget — Be safe!

Everyone has his own little niche to worry about prior to any deployment. If you want to talk life change units — JACKPOT. Then there's always the postdeployment "Get Home Itis," another JACKPOT.

The Eleventh General Order should read, "Be especially watchful at night and during times of deployments, to challenge all things new and to allow none to crash without proper authority," or as Granny would say, "Y'all come back now, Y'hear." ◄

Want to be a famous writer?

Norfolk, VA — APPROACH's **two senior writers, Russ Forbush and Chick Eldridge, are planning to retire this coming February. Not only will they be sorely missed, but they will be hard to replace. This is *not* an official job annoüncement, just a feeler to see who might be available and interested. When these jobs are officially announced, they will probably be listed as GS-1083-9/11. Some combination of aviation, journalism and safety backgrounds would be required. If you are interested, please contact me for further details. A resume and a sample of your writing would be helpful.**

John M. Flynn
Editor

Metal From Heaven

Washington, D. C. — Having recently flown out of NAS Miramar, I can heartily endorse the efforts by COMFITAEWWINGPAC in reducing "Metal From Heaven" (the subject article appeared in the Dec 1982 issue of *Approach*). The thorough inspections conducted by the final checkers were representative of the professional attitude of everyone that I met, from the flight line to the BOQ.

I fully support *Approach* in their call to other aviation communities to initiate a FOD program similar to that at Miramar.

C. T. Hucklebery
Colonel USMC

Re: "Not Even a Good Guess" Feb '83

St. Charles, IL — Mr. Eldridge has made a good point in his article — if an aircraft is lost in the water "the question of how and why must remain unanswered."

Fortunately, many aircraft today carry a device that can assist in locating them underwater. Many Navy airc:aft are included, as are the USCG, USAF and the military arms of several foreign countries. The Underwater Locator Device, or "pinger," weighs 12 ounces, is one and one-half inches by four inches, is totally self-contained and can be mounted to the aircraft by four bolts. It sends an acoustic signal through the water for thirty days over an area two to four miles in diameter. The receiving gear, in widespread use by EOD and SupSalvage, is directional enough to bring the searcher into contact with the pinger even in zero visibility.

There are approximately 40,000 such pingers in use today, and they have often proven their worth as shown by the enclosed search reports.

Joseph H. Lyon
General Manager
SeaCom Division
Dukane Corporation

• Underwater acoustic locator devices are currently being used on selected naval aircraft. Navy-wide utilization of these devices is limited to CONUS. The use of deployable flight data recorders in the future will alleviate the need for pingers. In addition to providing information concerning the location of the wreckage, deployable flight data recorders have the added advantage of providing detailed information on various aircraft system parameters which will be invaluable for determining the cause of the mishap.

RE: "Lightning and Naval Aviation" (June 1983)

Moffett Field, CA — Your article stated that during the last 10 years in which 470 lightning strikes occurred, no fatalities have been recorded. That may be true. However, in August 1970, a P-3 did suffer tragic consequences by venturing too close to a thunderstorm in Nevada. The most probable cause of the resulting crash that killed 10 people was listed as a lightning strike which ignited fuel vapors in the wing. Anyone flying around thunderstorm country should keep that mishap clearly in mind and never forget that it could always happen again.

J. P. McElhenny, Jr.
COMRESPATWINGPAC

Hampton, VA — In the article, "Lightning and Naval Aviation" the way the statistics of lightning strikes to aircraft are given as a function of altitude may mislead the reader into inferring that lightning occurs at these altitudes at the same frequencies. That is, "... 96 percent of the strikes occur below 25,000 feet altitude, and the remaining between 33,000 and 37,000 ...." In addition, the article states, "... 88 percent (of the strikes) occurred during precipitation . . ." and "81 percent occurred during reported turbulence ...."

These results are at variance with experience to date in the NASA Langley Research Center's Storm Hazards Program. This program involves direct strikes to a highly instrumented NASA-owned and operated F-106B airplane for the purpose of characterizing the atmospheric electricity hazard for aircraft utilizing digital control systems and composite systems. The program results have also been summarized in *Flying Safety* magazine, published by the Air Force Inspection and Safety Center. Pertinent points are:

1. In 1980 and 1981, we "flew the freezing level" in accordance with the then current wisdom and got only 10 hits each year.

2. In 1982, we generally flew -20° C or colder, and received more than 150 hits.

It appears, then, that there is considerable lightning activity above 25,000 feet. The discrepancy in these data sets can probably be attributed to the fact that at the higher altitudes (25,000 to 40,000 feet) jets usually deviate around the buildups, whereas at the lower altitudes (10,000 to 15,000 feet) deviations are more restricted by the need to depart or approach the runway and by ATC restrictions. Admittedly the F-106B data are somewhat biased, in that beginning in mid-season '83 we tended to fly in cells that were known to be electrified by indications from airborne and ground-based lightning locators.

Finally, most of our 176 strikes were obtained under negligible turbulence and precipitation intensity. This conclusion applies mostly to the high altitude strikes, of course.

Norman L. Crabill
Head, Special Projects Office
Low-Speed Aerodynamics Division
NASA Langley Research Center

Atlantic City, NJ — The Federal Aviation Administration Technical Center has published proceedings from the Eighth Annual International Aerospace and Ground Conference on Lightning and Static Electricity. The conference was held during a Lightning Technology Round-up June 21-23 at Fort Worth, Texas.

The conference was sponsored by the National Interagency Coordination Group (NICG) of the National Atmospheric Electricity Hazards Protection Program in concert with the Florida Institute of Technology. The NICG consists of research experts from the FAA, U.S. Army, U.S. Navy, U.S. Air Force, National Aeronautics and Space Administration, and the National Oceanic and Atmoshperic Administration.

Ninety-seven papers presented at the conference are contained in the proceedings. Subjects include: phenomenology, lightning modeling, ground system protection, helicopter lightning protection, flight environment, full-scale simulation and test techniques, 'p' static and corona, and lightning locators.

Copies of the 738-page document, entitled, "National Atmospheric Electrical Hazard Protection Program, Lightning Technology Round-up, Fort Worth, Texas, 21-23 June 1983" No. DOT/FAA/CT-83-25, are available for $25 by writing to Michael Glynn (ACT-340), FAA Technical Center, Atlantic City Airport, NJ 08405. Make checks payable to IALC-8.

Michael Yaffee
FAA Technical Center

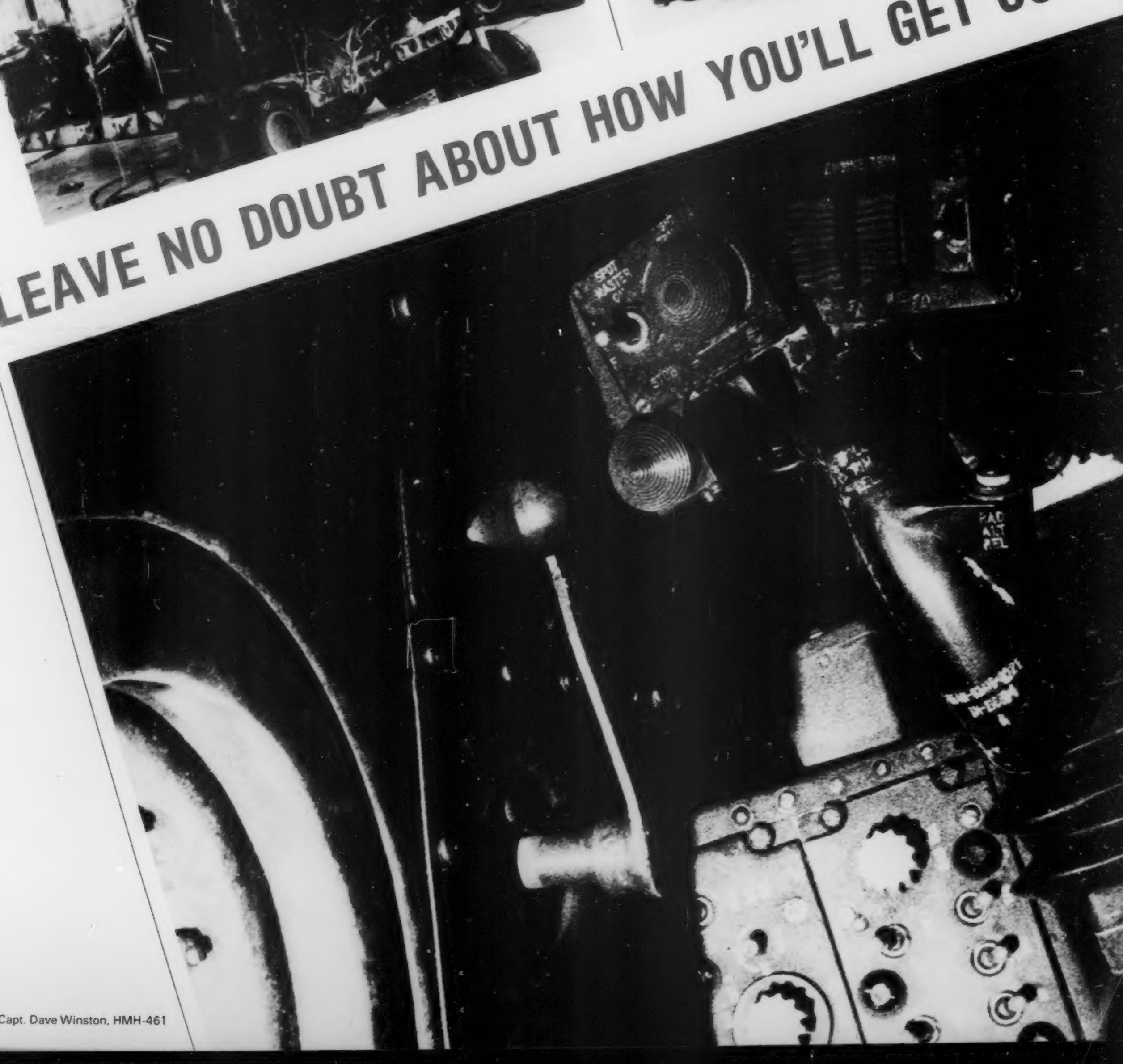
• This document is about the size of the Chicago phone book. For our technically-oriented readers, it seems to be "everything you ever wanted to know about lightning."

Incorrect Photo Credit

The cover photo on our June '83 issue was taken by Mr. Desmond Grout of British Aerospace Corp. aboard the USS NASSAU (LHA 4). The photo credit listed on page one is incorrect.

One got out, one didn't.

LEAVE NO DOUBT ABOUT HOW YOU'LL GET OUT.



Poster idea by Capt. Dave Winston, HMH-461


SA
151920
NAVY
HC-3
2
The LSE...
just think of him
as your life insurance man.